Interconnection

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1. **Definition of Terms**
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Who is Oncor?

• Oncor is a regulated distribution and pipeline energy delivery company and does not buy or sell energy.

• Oncor is governed by tariffs and bills Competitive Retailers (CR's) for wire related delivery service charges and then CR's choose how they charge customers.

• Oncor's role is to insure the safe and reliable interconnection of distributed generation to its electrical system.

What is Distributed Generation (DG)? (PUCT)

• An electrical generating facility located at a customer's point of delivery (point of common coupling) of ten megawatts (MW) or less and connected at a voltage less than 60 kilovolts (kV) which may be connected in parallel operation to the utility system.

• Consists of one or more units; total capacity may exceed 10MWs, however, no more than 10 MWs of a facility's capacity will be interconnected at one time (at the point of common coupling).

What are the common types of interconnections?

- Open transition
- Closed transition
- Parallel Non-exporting
- Parallel - Exporting

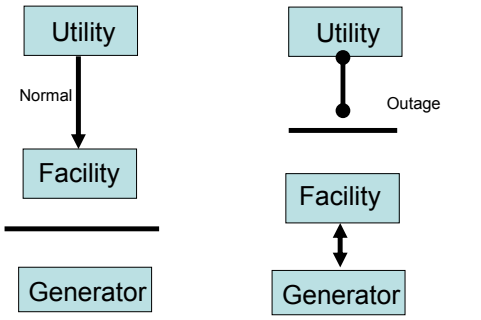
Open Transition

• Method describing how a customer re-connects back to the utility after a utility outage. Open transition is where generator is turned off (after being run during an outage or event) and then customers breakers are re-closed with the utility. The customers generation is never tied to the utility.

• This kind of generation is not defined as "distributed generation" by the PUCT (or Oncor).

Definition of terms

Open Transition (stand-by)



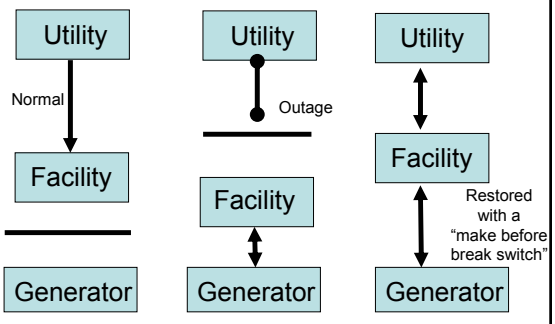
Definition of terms

Closed Transition

- Method of describing how the generator re-connects with utility. After the generator has been run, due to outage or event, a closed transition switch occurs where the generator parallels with the distribution system for a brief period of time and then is shut down.
- This mode of operation is defined as "distributed generation" by the Public Utility Commission of Texas (PUCT).

Definition of terms

Closed Transition



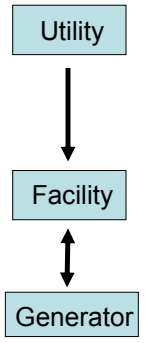
Definition of terms

Parallel Operation (Non-exporting / Exporting)

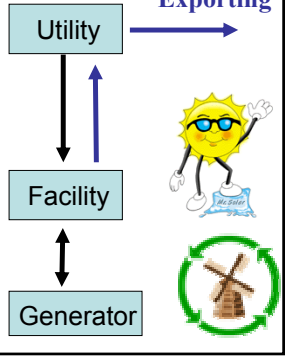
- A method of connection between the Company's distribution system and the customers generation in a manner to permit electrically interconnected operation of the two systems for a period of time.
- Non-exporting
- Exporting

Also defined as DG by PUCT

Parallel (non-exporting)



Parallel Exporting



Rules in Texas

Public Utility Commission Rules and Documents
http://www.puc.tx.us/rules/subrules/electric/index.cfm

- Substantive Rule §25.211 (interconnection guidelines)
- Substantive Rule §25.212 (technical requirements)
- Interconnection Agreement
- DG Manual
- DG Pre-certification process

Interconnection Issues

What is the DG interconnection process?

- Application (completed)
- Study fee's (utility tariff dependent)
- Impact study (or Service Study) preformed
- Payment for impacts (where appropriate)
- Utility system modifications (if necessary)
- Secure Interconnection Agreement and required test reports
- Authorize interconnection

Interconnection Issues

Pre-Interconnection Study Fee Schedule For Distributed Generation

Size Range	Parameters	Fee
0 to 10 kW	Pre-certified, not on network	$0
	Not pre-certified, not on network	$220
	Pre-certified, on network	$200*
	Not pre-certified, on network	$330
10+ to 500 kW	Pre-certified, not on network	$180**
	Not pre-certified, not on network	$320
	Pre-certified, on network	$960*
	Not pre-certified, on network	$1,725
500+ to 2000 kW	Pre-certified, not on network	$510
	Not pre-certified, not on network	$650
	Pre-certified, on network	$2,550
	Not pre-certified, on network	$2,550
2000+ kW	Pre-certified, not on network	$860
	Not pre-certified, not on network	$1,000
	Pre-certified, on network	$3,000
	Not pre-certified, on network	$3,653

Non Exporting
Discretionary Service Charge DD24

* No cost if 20 KW or less inverter is used
** No cost if generator supplies less than 15% of feeder load and less than 25% of feeder fault current

http://www.oncorgroup.com/electricity/distgen/default.asp
http://www.oncorgroup.com/electricity/tariffs/pdf/marketopen/6.1.2_MarketOpen.pdf

Interconnection Issues

Current Pre-certification Policies

- Photovoltaic Systems
- Wind

Size		*Study Fee's*
Small systems up to 10 kW	Service Study	No impact study fee*
Intermediate systems 10 kW to 500 kW (not on network)	Adjustable setpoints to meet §25.212	No impact study fee*

*** Conditioned on UL-1741 testing requirements and / or other conditions as approved by Oncor**

Interconnection Issues

How much can I be paid for power exported for Qualifying Facilities?

PUCT Substantive Rule §25.242 regulates the arrangements between qualifying facilities, retail electric providers with the price to beat obligation (PTB REPs), and electric utilities as required by federal and state law.

For Oncor to process your interconnection application and provide an estimate of any appropriate metering costs, you will need to provide to Oncor the metering requirements required by your Retail Electric Provider (REP).

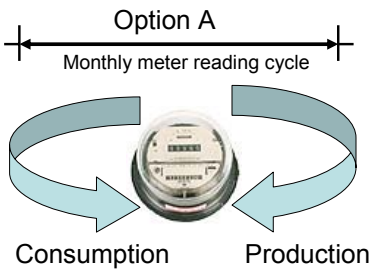
Option A, B, and C of this rule give you an overview of your metering options.

How much can I be paid for power exported for Qualifying Facilities?

Option A - (often called net metering)

For people who do not want to be paid for net production (where net production means there was more generation than consumption and a negative month-end meter reading results).

This option utilizes a single meter that runs forwards and backwards (typically existing metering). Net end-of-month production would not be metered or purchased by the utility (meaning the Competitive Retailer - CR).



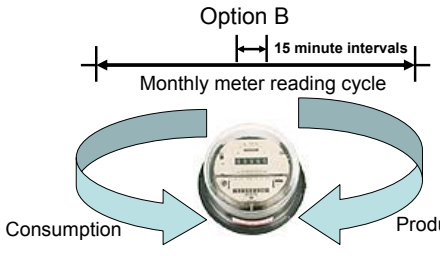
If Consumption > Production = kWhrs reduced for normal billing

If Consumption < Production = kWhrs set to zero for billing cycle

Option B

For people who do want to be paid for net production (end-of-month net metered generation), the rule states that this option utilizes two meters, one measuring net consumption and the other measuring net production. This option requires you to contact your REP to determine, 1) the process for registering and the requirements for being a power generator in ERCOT and 2) the REPs metering requirements for exporting generators. Most REPs require an interval data recorder (IDR) meter to be installed to establish the rates for purchases of exported generation.

* Oncor's tariff specifies IDR metering and interval load data charges.



If Consumption > Production = kWhrs reduced for normal billing

IDR Meter

Channel A

15 minute intervals paid at avoided costs

If Consumption < Production = kWhrs (exported)

Channel B

Option C

For people who want to be paid for all production. This option requires metering for all consumption and all production. Requirements from your REP and metering information will need to be specified with your application (reference Option B).

ERCOT Activity

Year-End 2002 ERCOT

	Oncor	Centerpoint	AEP	Entergy	TNMP	Total
Number of Facilities	50	20	8	1	1	83
Output of Facilities (kW)	158,033	43,013	14,250	5	5,000	220,305
Facilities Interconnect-ed in 2002	6	3	1	1	0	12
Output of Interconnect-ed in 2002 (kW)	5,572	8,504	2.000	5	0	16,804

Questions ?

Helpful Links:

1) Guide to Electric Choice - Listing of Retail Electric Providers
http://www.powertochoose.com
2) PUCT Substantive Rules 25.211 and 25.212 Interconnection of On-Site Distributed Generation and Technical Requirements for Interconnection and Parallel Operation of Distributed Generation (Site Map - Rules and Laws - Electric - Substantive Rules - 25.211 - 25.212)
http://www.puc.state.tx.us/rules/subrules/electric/index.cfm
3) PUCT Requirements for Precertification of Distributed Generation Equipment (Site Map - Electric - Projects - Project No. 22318)
http://www.puc.state.tx.us/electric/projects/22318/22318.cfm
4) PUCT Distributed Generation Manual (Site Map - Electric - Projects - Project No. 21965)
http://www.puc.state.tx.us/electric/projects/21965/21965.cfm
5) ERCOT Market Guide (see 3rd bullet)
http://www.ercot.com/Participants/marketoverviewinfo.htm
6) Power Generation Company requirement link from the PUCT
http://www.puc.state.tx.us/electric/business/index.cfm#3